Problem Set 8

This problem set is due on **Friday Apr 2, by 4:00pm.**

Use the CS172 drop box.

Write **your name and your student ID number** on your solution. Write legibly. The description of your proofs should be as *clear* as possible (which does not mean *long* – in fact, typically, good clear explanations are also short.) Be sure to be familiar with the collaboration policy, and read the overview in the class homepage `www.cs.berkeley.edu/~luca/cs172`.

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1. Formulate factorization as a language. That is, describe a language L such that $L \in \mathbf{P}$ if and only if there is a polynomial time algorithm to (completely) factor positive integers (where the input is the binary representation of the integer). In addition, prove that your language has the required property.
2. Sipser problem 7.21.
3. Sipser problem 7.29.
4. Sipser problem 7.30.